IN THE SPECIFICATION

Please amend the specification as shown below.

Please insert the following on page 1, line 2 before the first paragraph.

1. Field Of The Invention

Please replace the paragraph beginning on page 1, line 3 with the following:

The present invention relates to a current source, and particularly, but not exclusively, to a current source adapted to generate a current proportional to absolute temperature (PTAT).

Please replace the paragraphs beginning on page 1, line 6 continuing on to page 2 with the following:

2. Discussion of the Related Art

PTAT current sources are used widely as biased current generators in integrated circuits. A simple implementation of such a source is shown in Figure 1. The circuit in Figure 1 has first and second branches connected between supply Vdd and ground GND rails. The first branch comprises a resistor Re1, a first bipolar transistor Q1 with its base tied to its collector, a second bipolar transistor Q3 and a resistor R. The second branch includes a third resistor Re2, a third bipolar transistor Q2 with its base connected to the base of the bipolar transistor in the first branch, and a fourth bipolar transistor Q4 with its base connected to its collector and its base connected to its corresponding bipolar transistor in the first branch. Thus, the first and third transistors are connected in a current mirror configuration, as are the second and fourth transistors. An output transistor Q_0 has its base connected to the bases of the first and third transistors Q1,Q2 and its emitter connected via a resistor Re0 to the upper supply rail Vdd. The output current Iout is the collector current of the output transistor Q_0 which is supplied to the load driven by the current source. The emitter of the second bipolar transistor in the second

branch is connected to the lower supply rail GND. In that circuit, assuming that the area of the bipolar transistor Q3 is n times the area of the bipolar transistor Q4, then it can be shown that the output current Iout is given by:

$$Iout = \frac{V_T \ln n}{R}$$

where V_T is the thermal voltage (KT/q) and ln is the natural log. Hence the output current Iout is proportional to the thermal voltage V_T, which is proportional to absolute temperature T. One drawback of the circuit of Figure 1 is that the value of the output current Iout increases with the supply voltage Vdd because of the early effect of the bipolar transistors. This variation of the output current with supply voltage can be reduced using various cascode configurations. However, ~~the use~~ a limitation of a cascode configuration is that it restricts the minimum operating voltage. In particular, with existing technologies it is not possible to use a cascoded PTAT current generator down to supply voltages as low as 1.2 V.

One example of a ~~cascaded~~ cascoded PTAT generator is shown in Figure 2. In Figure 2, the mirror connected bipolar transistors QC1 and QC2 form a cascode for transistors Q1 and Q2. Since the transistors Q1 and QC1 both have a voltage drop of around 0.6 V, it is clear that it is now not possible for the circuit to operate at 1.2 V. In fact, the minimum voltage is around 1.6 V. In Figure 2, the output transistor Q_0 is not shown.

Please insert the following before the paragraph beginning on page 2, line 12.

Summary Of The Invention

Please replace the paragraph beginning on page 2, line 20 with the following:

Preferably each circuit branch comprises series-connected bipolar transistors. The first transistor in the first branch and the first transistor in the second branch are connected together in

a current mirror configuration. Likewise, the second transistor in the first branch and the second transistor in the second branch are connected together in a current mirror configuration.

Please insert the following before the paragraph beginning on page 2, line 28.

Brief Description Of The Drawings

Please insert the following before the paragraph beginning on page 3, line 3.

Detailed Description

Please insert the following after the last paragraph on page 4.

Having thus described at least one illustrative embodiment of the invention, various alterations, modifications, and improvements will readily occur to those skilled in the art. Such alterations, modifications, and improvements are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description is by way of example only and is not intended as limiting. The invention is limited only as defined in the following claims and the equivalents thereto.

What is claimed is: